We claim:

1. An atomic layer deposition arrangement comprising:

a process reactor chamber including an inlet for receiving precursor gases and at least one outlet coupled through an outlet line to an exhaust pump,

a first precursor gas valve which receives a first precursor gas, said first precursor gas valve coupled to said inlet,

a second precursor gas valve which receives a second precursor gas, said second precursor gas valve coupled to said inlet,

a first bypass conduit coupled to said first precursor valve,

a second bypass conduit coupled to said second precursor valve, and

wherein said first bypass conduit and said second bypass conduit are isolated from the outlet line.

2. An atomic layer deposition arrangement according to claim 1 wherein the first precursor gas valve and second precursor gas valve are each three way valves.

3. An atomic layer deposition arrangement according to claim 1 wherein the first precursor gas valve and second precursor gas valve each include two two-way valves.

4. An atomic layer deposition arrangement according to claim 1 wherein the first bypass conduit and the second bypass conduit are isolated from each other.

5. An atomic layer deposition arrangement according to claim 1 further comprising a substrate holding device located in the process chamber, the substrate holding device movable in a longitudinal direction.

6. An atomic layer deposition arrangement according to claim 1 wherein the chamber includes a sub-chamber and wherein the at least one outlet is located in the sub-chamber.

7. An atomic layer deposition arrangement according to claim 5 wherein the substrate holding device comprises a vacuum hold down system.

8. An atomic layer deposition arrangement according to claim 7 wherein the vacuum hold down system includes a hollow shaft connected to a plate member having at least one through hole.

9. An atomic layer deposition arrangement according to claim 1 further comprising a valve which receives a purge gas, said valve coupled to the inlet to the process reactor chamber.

10. A method for delivering precursor gas to an atomic layer deposition chamber comprising:

placing a substrate onto a substrate holding device in a process reactor chamber having a chamber inlet and chamber outlet,

isolating the chamber by closing a gate valve,

reducing pressure in the chamber by moving the substrate holding device upward in a longitudinal direction to provide a high conductance connection between the chamber and the vacuum pump,

isolating the chamber from the vacuum pump by moving the substrate holding device downward in a longitudinal direction to provide a minimum conductance connection between the chamber and a vacuum pump,

flowing a first precursor gas to an inlet of a bypass position of a first gas valve, the first gas valve including a chamber delivery position coupled to the chamber inlet,

switching said first gas valve to the chamber delivery position to convey the first precursor gas from the gas valve to the chamber inlet,

switching said first gas valve to the inlet of the bypass position of the first gas valve,

reducing pressure in the chamber by moving the position of the substrate holding device upward in a longitudinal direction to provide a high conductance connection between the chamber and a vacuum pump,

isolating the chamber from the vacuum pump by moving the substrate holding device downward in a longitudinal direction to provide a minimum conductance connection between the chamber and a vacuum pump,

flowing a second precursor gas to the inlet of a bypass position of a second gas valve, the second gas valve including a chamber delivery position coupled to the chamber inlet,

switching said second gas valve to a chamber delivery position to convey the second precursor gas from the second gas valve to the chamber inlet,

switching said second gas valve to the inlet of the bypass position of the second gas valve,

wherein said second precursor gas is conveyed to the chamber inlet without previously purging the chamber with a full dose of purge gas.

11. A method for delivering precursor gas to an atomic layer deposition chamber according to claim 5 wherein the first precursor gas valve and second precursor gas valve are each three way valves.

12. A method for delivering precursor gas to an atomic layer deposition chamber according to claim 5 wherein the first precursor gas valve and second precursor gas valve each include two two-way valves.

13. A method for delivering precursor gas to an atomic layer deposition chamber comprising:

placing a substrate onto a substrate holding device in a process reactor chamber having a chamber inlet and chamber outlet,

isolating the chamber by closing a gate valve,

reducing pressure in the chamber by moving the substrate holding device upward in a longitudinal direction to provide a high conductance connection between the chamber and a vacuum pump,

isolating the chamber from the vacuum pump by moving the substrate holding device downward in a longitudinal direction to provide a minimum conductance connection between the chamber and the vacuum pump,

flowing a first precursor gas to an inlet of a bypass position of a first gas valve, the first gas valve including a chamber delivery position coupled to the chambers inlet,

switching said first gas valve to the chamber delivery position to convey the first precursor gas from the gas valve to the chamber inlet,

switching said first gas valve to the inlet of the bypass position of the first gas valve,

reducing the pressure in the chamber by moving the substrate holding device upward in a longitudinal direction to provide a high conductance connection between the chamber and a vacuum pump,

flowing a purge gas into the chamber inlet to flush the residual said first gas from the chamber wherein the purge gas is flowed through the chamber in an amount less than a full dose of purge gas,

reducing the pressure in the chamber by moving the position of the substrate holding device upward in a longitudinal direction to provide a high conductance connection between the chamber and a vacuum pump,

isolating the chamber from the vacuum pump by moving the substrate holding device downward in a longitudinal direction to provide a minimum conductance connection between the chamber and a vacuum pump,

flowing a second precursor gas to the inlet of a bypass of a second gas valve, the second gas valve including a chamber delivery position coupled to the chamber inlet,

switching said second gas valve to a chamber delivery position to convey the second precursor gas from the second gas valve to the chamber inlet,

switching said second gas valve to the inlet of the bypass position of the second gas valve, and

flowing a purge gas into the chamber inlet at a pressure to flush the residual said second gas from the chamber.

14. A method according to claim 13 wherein the purge gas is selected from the group consisting of nitrogen and argon.

15. A method according to claim 13 wherein the first precursor gas and second precursor gas valve are each three-way valves.

16. A method according to claim 10 wherein the first precursor gas is selected from the group consisting of Si_2Cl_6 and $TiCl_4$.

17. A method according to claim 10 wherein the second precursor gas is selected from the group consisting of NH_3 and activated NH_3.

18. A method according to claim 13 wherein the first precursor gas is selected from the group consisting of Si_2Cl_6 and $TiCl_4$.

19. A method according to claim 13 wherein the second precursor gas is selected from the group consisting of NH_3 and activated NH_3.

20. A method according to claim 14 wherein the first and second precursor gas are selected from the group consisting of Si_2Cl_6 and NH_3, $TiCl_4$ and NH_3, and Si_2Cl_6 and activated NH_3.

21. A method according to claim 13 comprising flowing the purge gas into the chamber inlet at a flow rate up to 1 standard liter per minute for less than than 2 seconds.